

CHILDHOOD APRAXIA OF SPEECH AND AUGMENTATIVE AND ALTERNATIVE  
COMMUNICATION: FAMILY PERSPECTIVES

By

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for the degree of Master of Arts

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## **Abstract**

The purpose of this study was to examine the perspectives of families of children with Childhood Apraxia of Speech (CAS) and augmentative and alternative communication (AAC). The study sought information regarding a) the frequency of AAC (specifically SGDs) being offered as an intervention tool for CAS to families, b) the information and support provided to families in regard to AAC, and c) families' perspectives of AAC as an intervention tool for CAS. A survey entitled "CAS and AAC: Family perspectives" was hosted online via Qualtrics. Family participation was solicited with help from organizations that support individuals with CAS at national, state and local levels. A total of 303 participants responded to the survey and 196 completed the survey.

The data revealed that the majority of families do not have a child who used AAC, stating that a lack of information regarding the benefits and implementation of AAC in their child's speech therapy and the lack of information regarding funding were reasons for not wanting to obtain a device for their child. Those that did have AAC primarily reported wanting and needing further information and support from professionals on how to implement their child's device at home. The families that had been provided with support and training and reported that their child's device was being incorporated in their speech services were more likely to note improvements in their child's communication than those that had not received training or support.

Speech-language pathologists and other related service professionals could use the data obtained in this study to improve their service delivery models for children with CAS and their families by increasing their knowledge related to AAC technology and the benefits of a multi-modal approach to therapy. Speech-language pathologists who provide services to children with CAS

should have knowledge and experience with AAC in order to discern which child would benefit from a multi-modal approach in their intervention plan.

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## **Chapter 1**

### **Introduction**

Being able to communicate effectively is a significant part of life. According to Light and Drager (2007), the four primary purposes of communication are exchanging information, building relationships, expressing wants and needs, and following social etiquette. Acquiring strong communication during childhood is important in allowing the child to establish friendships and participate in activities at home, school, and the community. An individual can communicate through written communication or gestures, but the most common form of communication is through verbal speech (ASHA, 2007). The development of speech begins at birth and is generally acquired naturally through exposure; however, it can be difficult for children with Childhood Apraxia of Speech (CAS).

### **Childhood Apraxia of Speech**

The American Speech-Language Hearing Association (ASHA, 2007) defines Childhood Apraxia of Speech (CAS) as a neurological speech sound disorder that affects the production and precision of sound movements due to neuromuscular deficits. These deficits result in impairments of motor planning and programming, overall affecting the child's ability to verbally communicate. CAS occurs in 1-2 children per 1,000 and is found in 3.4%-4.3% of children referred for speech disorders (Delaney and Kent, 2004). It generally affects more boys than girls and has a higher prevalence in children with certain medical conditions such as galactosemia and fragile X syndrome. The degree of deficits in CAS has made it recognized as a complex disorder in which symptoms can range from mild to severe (Lüke, 2014). The disorder can persist throughout an individual's lifetime, and can lead to a higher risk for language, reading and spelling difficulties (ASHA, 2007).

Bornman, Alant and Meiring (2001) noted that due to the highly heterogeneous symptoms, the diagnosis of CAS has been challenging for speech pathologists. In their study, they reported that documented early symptoms are delayed onset of speech and a small repertoire of consonants and vowels. Later in development, other common speech characteristics are slow production of rapid, repetitive consecutive oral movements, difficulties initiating speech movements, groping behaviors, vowel and fricative errors, impaired production of sound sequencing and inconsistent errors. The child may also present with limited expressive language skills in proportion to receptive abilities. Bornman et al. (2001) noted that language development is generally delayed due to a late onset of words and combining words to form sentences. Children with CAS often use one word for multiple meanings, inhibiting their ability to communicate wants and needs effectively. Binger and Light (2007) found that many parents reported that their child used gestures to compensate for disordered verbal communication. As a result of poor intelligibility, children with CAS can exhibit communication frustrations, challenging behaviors, passivity in conversations, poor social interactions, and delayed language development. In 2007, ASHA noted that speech impairment causes limitations in Activities and Participation in the *International Classification of Function (ICF)*, a framework used to address function and disability within the context of an individual's activities and participation in everyday life .

Given the research findings regarding the impact of CAS on speech, behavior, pragmatics and language skills, a two-method approach to intervention is needed for this population (Binger and Light, 2007). Conventional treatment approaches consist of concentrated drill practice on vowel-consonant movement patterns and sequences of sounds, reduced speech rates, carrier and high frequency vocabulary and phrases, intonation and rhythm (Bornman et al., 2001). However, due

to the persistent nature of the disorder in an individual's lifetime, alternative communication is needed to facilitate speech and language development throughout treatment particularly for those with severe CAS. In addition to intensive speech therapy to improve skills, it has been recommended in the literature that children with CAS use augmentative and alternative communication (AAC) to address both the child's immediate and long-term communication needs (Binger and Light, 2007; Bornman et al, 2001; ASHA, 2007).

### **Augmentative and Alternative Communication**

AAC is the “field area of clinical, educational, and research practice to improve, temporarily or permanently, the communication skills of individuals with little or no functional speech and/or writing” (ASHA, 2002, p. 1). The purpose of AAC is to augment or replace natural speech for those with limited verbal expression in order for them to communicate effectively with all communication partners in various environments and activities (Lüke, 2014). The two types of AAC systems are unaided and aided. Unaided AAC systems include gestures, body language, facial expressions and sign language. While unaided systems are naturalistic and convenient to use, the gestures or signs may be too abstract and easily misunderstood by unfamiliar communication partners. Furthermore, unaided systems require a degree of motor planning and fine motor development that children with CAS may not have (Binger and Light, 2007). Aided systems on the other hand make language visual, tangible and clear. Aided AAC includes the use of a tool or device to communicate. Aided AAC can be low-technology, such as pen and paper or pictures; it can also come in the form of high technology, such as speech-generating devices (SGD). Common aided AAC tools that have been used in therapy with children with CAS are remnant books (i.e. scrapbook of photos from child's life), theme boards (i.e. a board for math, a board for eating at a restaurant), communication dictionaries (i.e. a book

of graphic symbols arranged by categories), and pre-programmed words and phrases on an SGD (Kent-Walsh & Binger, 2015).

SGDs, or AAC devices, are electronic communication aids that use synthesized speech to communicate thousands of stored words and phrases (Soto and Clarke, 2017). They bring advantages, such as increasing intelligibility of utterances to all communication partners, improving the speed and accessibility of communication, increasing communication independence, and allowing the AAC user to feel that he/she has a “voice.” According to Bornman et al. (2001), an AAC system that incorporates the use of both aided and unaided systems is optimal for children with limited functional communication and can facilitate “independence and active participation in society” (p.8).

### **Childhood Apraxia and AAC**

***Promising Evidence:*** Murray et al. (2014) stated in their systematic review of treatment outcomes that the primary concern in CAS is “developing intelligible speech, either through addressing articulatory and prosodic accuracy or through improving phonology, although concentration on AAC and expressive language may be required” (page 500). Research shows that waiting for a child to acquire speech naturally or devoting a significant amount of time and focus to speech-only intervention can ultimately delay language and conversational development (Lüke, 2014; Binger and Light, 2007; Bornman et al., 2001). The inclusion of AAC with conventional speech therapy can help facilitate general communication interactions and support language learning. Since treatment approaches for CAS emphasize a need for intensive and ongoing speech therapy to improve skills, children with CAS can benefit from AAC to address their immediate communication needs. Nearly all investigations on CAS stress the need for a

multimodal approach when providing intervention for this population, particularly recommending the incorporation of AAC in intervention (Murray et al., 2014).

According to Binger and Light (2007), AAC supports various areas of communication for children with CAS including communication repairs, topic initiation, small talk, narrative discourse, message length, and message complexity. Furthermore, it supports social interactions, improves communication frustrations and decreases challenging behaviors. They also stated that children with CAS using SGDs displayed an increase in effective communication, initiation of interactions, use of more complex sentence structures and general conversational control during interactions.

Oommen and McCarthy (2015) conducted a qualitative research study investigating eight speech-language pathologists that were implementing both AAC and natural speech services simultaneously for children with CAS on their caseload. The study presented suggestive evidence to support the effectiveness of simultaneous implementation of AAC intervention and natural speech therapy for children with CAS, providing a foundation for multiple modalities in communication in therapy for this population.

Four single-subject studies investigated the outcomes of children with CAS after the implementation of AAC. Lüke (2014), investigated the impact of SGDs on the communication and language development of a 2-year old boy with severe CAS. Lüke found that after the child received AAC intervention for 25 sessions, he produced more communicative acts and increased speech and language competencies. It was also reported that AAC created a focus on the establishment of basic communication instead of putting pressure on the child's limited speech competencies. They speculated that the pressure to be intelligible was gone with the use of AAC, allowing the child to focus on developing his communication and language skills which in turn

increased his initiations and interactions with others. Finally, Lüke found that the boy's intelligibility increased significantly after intervention. This study provided highly suggestive evidence implying that the use of SGDs can lead to improvements in communication and language after an alternative mode of communication (SGD) is implemented.

Bornman et al. (2001) also conducted a single-subject study, investigating a 6-year-old boy with CAS who had been receiving intensive speech therapy for 2.5 years. The team incorporated an SGD in his therapy and trained his mother as to how to use the device with her son at home. After seven weeks, they reported that the SGD facilitated growth of high cognitive language functioning in the child. The boy also showed an improvement in willingness to participate in activities, a heightened attention span, a decrease in hyperactivity, an increase in self-confidence, and an improvement in independence and better achievement in the classroom after incorporating AAC in his therapy. This study provided somewhat suggestive evidence on the effectiveness of AAC on speech and language development, particularly the facilitation of higher level communication development.

King, Hengst and DeThorne (2013) conducted a multiple-probe, single-subject research study investigating the effectiveness of a multimodal intervention approach for three young boys, including a boy with CAS. Each treatment session included a shared storybook reading activity, natural speech target drills and structured play. Results suggested that the implementation of a multi-modal intervention approach for the three boys increased production of speech and increased the accuracy of target speech sounds. Though only one of the participants had CAS, the researchers provided a highly suggestive level of evidence to support the effectiveness of a multi-modal intervention approach for improving communicative abilities in children with CAS.

Culp (1989) investigated the effects of Partners in Augmentative Communicative Training program (PACT) for an eight-year old girl with CAS during a single-subject design study. The child's communication skills showed improvement at the conclusion of the study. The child demonstrated an increase in intelligibility and communication interactions and her mother noted the effectiveness of the program. This study provided somewhat suggestive evidence that multi-modal intervention improves communicative interactions for children with CAS, though the study was program specific and should be considered with caution.

One case report was found regarding CAS and AAC. Cumley and Swanson (1999) analyzed the effects of an AAC device with three girls ages 3-4 with CAS. The intervention involved implementation of several AAC devices (paper-based and SGD) for six months. Measurements were made on language, such as increase in MLU. Results indicated increased development in expressive language, such that one of the children in the study moved into the average range on a normal distribution curve. This study presented with reasonably suggestive evidence noting the effectiveness of multi-modal intervention and the role AAC has on facilitation and development of natural speech in children with CAS.

Beale (2017) reviewed these studies and noted that “collectively the studies provide evidence to support the benefits of AAC use for children with CAS, highlighting the positive impact of implementing AAC intervention in conjunction with natural speech therapy” (p.4). Though there is no particular AAC device that is recommended for this population, there are a wide variety of AAC options that can be selected for a child with CAS' individual needs. There is some knowledge about the effectiveness of AAC use on speech and language development in children with CAS; however, more research needs to be conducted in order to investigate the benefits further.



***Misconceptions about AAC:*** Unfortunately, there is a limited amount of research investigating the impact of AAC intervention for children with CAS, but it does appear promising. Ronski and Svecik (2005) reported that AAC is commonly considered as a last resort by families. Generally, AAC is still not readily incorporated in therapy by speech language pathologists for children with CAS, with families reporting that they need more information (Cumley, n.d). Studies have shown that due to the lack of information regarding the benefits of AAC, the child's team (i.e., parents and other professionals) typically wants to focus on the child acquiring speech (Beale, 2017; Parette et al., 2000; Ronski and Svecik, 2005; Binger and Light, 2007). Many parents and professionals are concerned that AAC will prevent the child from talking and will further delay the development of natural speech. They worry that AAC will become a "crutch" for the child and that it will inhibit the emergence of speech (Millar, Light, and Schlosser, 2006). Millar et al. (2006) also found that parents and professionals typically show apprehension towards incorporating AAC, stating that the child will prefer to use the device versus their natural speech since it is easier to communicate with. A counterargument to this was made by Silverman (1995) and Hanline, Nunes, and Worthy (2007) who found that AAC augmented language instead of inhibiting it in children acquiring speech. Furthermore, it did not reduce a person's motivation to communicate verbally. A study conducted by Fishman (1987) found that focusing simultaneously on natural speech and the use of AAC in a multimodal therapeutic approach improved natural speech for communication purposes. In addition, Cumley (n.d) stated that as a child's natural speech increases as the primary mode of communication, AAC tools and strategies will typically fade out.

Another common belief is that young children are not ready for AAC and will not require the use of AAC until they are of school age (ASHA, 2002). Ronski and Sevcik (2005) reported that

many families view AAC as a last resort to lack of speech and language development; however, they argued that it is critical that AAC be introduced before communication failure occurs. This means that AAC is not only for an older child who has been unable to establish a functional means to communicate, but also for a young child who is still developing communication and language skills. In the study conducted by Bornman et al. (2001), they urged that it is essential for children with CAS to begin using an AAC system at an early age so that they have the opportunity to use and “play” with language. The early implementation of an AAC device in therapy can aid the development of language and natural speech skills and has shown to improve and increase vocabulary in children ages 3 and younger (Lüke, 2014). In 2007, Binger and Light (2007) found that when AAC was used with children of preschool age, an increase of multisymbol utterances and grammar development was displayed. Furthermore, an improvement in receptive vocabulary was shown after the implementation of AAC in the classroom. Due to an increase in self-confidence, learning and communication after the implementation of AAC in their case study, Bornman et al. (2001) noted that it is crucial to provide access to speech at an early age.

Some parents and professionals may be under the impression that prerequisite skills, such as the ability to show intent for communication and understanding cause and effect, are needed before using AAC. Furthermore, it is widely believed that individuals with cognitive deficits are not able to learn how to use AAC and that it is not a suitable communicative method for this population. ASHA (2002) stated that previous research has shown that measures of pre-communicative cognitive ability is invalid for some populations and that impaired cognition does not rule out communication. Lüke (2014) noted that development of language skills, which AAC intervention has been shown to foster, can lead to an increase in cognitive abilities. Providing

AAC intervention for children with complex communication needs not only helps develop functional communication skills, but it also fosters cognitive development by providing a strong foundation for literacy growth and improving social communication. In the case study conducted by Bornman et al. (2001), they found that their participant received access to higher level of language functioning through the use of AAC and that he showed improvements in his school work and participation in class as reported by his teacher and mother. The use of an effective communication device allowed the child's parents to ask higher cognitive level questions, which as a result was reported to facilitate communication development. Giving the child a means to communicate effectively allows the child to demonstrate their cognitive abilities.

### **Support and Implementation of AAC**

Families have expressed frustration in the lack of information they received about AAC from their child's school team and that generally they are not involved in the decision-making process (Bailey, 2006). They report that it is usually professionals determining which device and intervention their child needs. In a survey of seventy-four families conducted by Hetzroni (2002), they found that only 21% of the families were involved in the AAC decision-making; school speech pathologists, teachers and/or other school team members were usually the ones who developed an AAC system for the child. Many parents want to be included in the decision-making process for their child in order to build rapport with the professionals and make sure that their values and beliefs are being respected (Bailey et al., 2006). In addition, families have expressed a need for further support in using AAC from professionals.

Families are the core members of the team attributable to the amount of knowledge and information they can share about the child's needs, goals, and priorities. They can provide valuable insight that can determine suitable therapeutic methods for the child, especially if it

includes AAC intervention (Parette et al., 2000). The majority of the child's time is spent with family/caregivers, therefore those individuals play a key role in facilitating communication, social interactions, language and successful AAC outcomes. In order for AAC interventions to be successful, professionals need to effectively communicate and collaborate with the child's family.

According to Bailey et al. (2006), families play a passive role in the AAC decision-making process, with the professionals usually making the majority of the judgements. They conducted semistructured interviews with six parents of seven male children with moderate to severe disorders who all used AAC. The families reported that many school professionals made decisions regarding the use of AAC before including the parents. Other participants reported that a single conversation or meeting was held before the decision on AAC was made by the school professionals. A few participants noted that they were involved in the process, yet they felt that there was not a total team approach when reaching a decision about AAC intervention.

A lack of collaboration can lead to insufficient information, training and support on AAC for families (Bailey et al., 2006). Families are a large component of successful AAC intervention due to their participation and awareness of the child's activities and interests. Their involvement in the AAC process often includes implementation of AAC intervention at home and sharing and taking on the responsibility of promoting the "operational, linguistic, social and strategic experiences for AAC users" (Angelo et al., 1995, p?). Especially for young users, the families are in charge of choosing relevant vocabulary and messages that are essential to the child, supporting device use across different settings, programming the devices, troubleshooting issues and keeping daily maintenance (i.e. charging the battery).

Parette et al. (2001) had 58 parents participate in focus groups and structured interviews in order to determine families' perspectives on AAC decision-making. They found that when families were not provided with adequate support, partial or complete abandonment of AAC in home and community was often the result. The common themes discovered in the study that were reported as important to the families was a) building family and professional partnerships, b) respecting family values and ethnicities, and c) helping families use their child's AAC device. Research indicates that parents often underuse AAC when they do not have enough information about the device, are lacking in professional support, and are not given training on how to use the device in the home setting (Bailey, Parette, Stoner, Angell, and Carrol, 2006). Families that abandoned the device reported that it was due to feelings of increased demand on family and professionals, less of a need for AAC use at home, lack of knowledge regarding how to use the device, and limited support (ASHA 2002; Parette and Angelo, 1996; Stephenson and Dowrick, 2005).

In a meta-analysis conducted by Kent-Walsh, Murza, Malani, and Binger (2015) comprised of 17 single-case design studies, there were large effect sizes of families reporting that AAC is "foreign" and that they were unsure how to engage with their child using the device. Operating an AAC device is not an intuitive process, and neither is facilitating communicative interactions. Having access to AAC support is not enough for successful integration and use outside of clinical settings. Intervention that includes instruction of families as communication partners is needed to have positive outcomes in the AAC user's communication development (Binger, Kent-Walsh, Ewing, and Taylor, 2010). Kent-Walsh and Binger (2015) reported that communication partners rarely ask AAC users to explain something, request something or even make a comment; however, past studies (Binger et al. 2010; Angelo et al., 1995; Marshall and Goldbart, 2008) indicate that partners can be successful in modifying their communication to better support

functional communication once given instruction. Supporting this, Bornman et al. (2001) reported that after training the child with CAS' mother as to how to be a supportive communication partner with AAC, she asked more questions that were higher cognitive levels, as identified by Bloom's Taxonomy. They credited this to the mother's increased comfort level using her child's AAC device after training. This study suggests that parents of children with CAS can enhance their communication with their child through the use of AAC. Bailey (2006) reported in her study that when parents are more comfortable implementing and using AAC at home this can improve the child and parent's relationship and increase independence for the child. However, in order to achieve this, it is important that the communication partners (families, caregivers, etc.) are given sufficient amount of instruction routinely until there is clear evidence that the individual can regularly demonstrate the skills needed to support communicative interactions in all settings (Kent Walsh & Binger, 2015).

Unfortunately, the need for training and supporting communication partners goes unrecognized and supported. Amundsen (2014) conducted a survey with 92 participants investigating SLPs perspectives on AAC. The study found that clinicians often find it challenging to assign time to provide indirect and direct intervention for communication partners. Furthermore, the clinicians had difficulty obtaining reimbursements for the time spent doing the trainings. Amundsen speculated that as a result, communication partners, families in particular, are feeling unsupported in AAC and need to show significant advocacy efforts to receive evidence based communication partner intervention. Most studies that have looked at AAC in home settings have focused on the general effects of AAC interventions rather than on the strategies used by families in order improve positive outcomes (Parette et al., 2000). Furthermore, there is a lack of information about how children interact with their AAC at home with their family as their main

communication partners and facilitators. Only 6 out of 40 studies reviewed by Snell, Chen and Hoover (2006) involved analyzing parents' implementation of AAC at home. As a result, further research is needed to understand and gauge family's needs at home when using AAC.

Review of the literature shows that families of children who use AAC often feel unsupported; however, these feelings may be exacerbated in those families with a child who has CAS. In a survey conducted by Carroll and Overby (2010) a majority of families with children with CAS experienced fear and grief when their child was diagnosed and that they felt that speech pathologists did not provide them with adequate social and emotional support. Out of the seventy-four families that completed the survey, 21% felt that speech pathologists did not have sufficient experience or knowledge about CAS nor understood the severity of the diagnosis. The study also revealed that 23% of the participants expressed low satisfaction with their child's therapy and 13% of the families felt that the speech pathologists did not provide them with enough information to carryover therapy at home and in the community. Finally, all of the families from the study expressed a concern about their child's future due to their disorder, indicating that speech pathologists need to help pacify parent's fears by finding therapeutic resources that can ensure communicative success throughout the child's lifetime.

**Purpose:** The review of literature has indicated that AAC is beneficial for children with CAS, especially when used in a multimodal approach; however, it is traditionally not introduced into an SLPs intervention plan (Cumley, n.d.) for this population. There is a need for research studies that explore families of children with CAS and their perspectives of AAC as a therapeutic tool for their child.

The purpose of this study was to a) examine the frequency of AAC (specifically SGDs) being offered as an intervention tool for CAS to families, b) the information and support provided to

families in regard to AAC, and c) families' perspectives of AAC as an intervention tool for CAS.

The information attained will assist speech language pathologists who provide intervention to children with CAS in their support of families of CAS who are considering using AAC.



## **Chapter 2**

### **Methods**

The purpose of this study was to a) examine the frequency of AAC (specifically SGDs) being offered as an intervention tool for CAS to families, b) the information and support provided to families in regard to AAC, and c) families' perspectives of AAC as an intervention tool for CAS. The information attained will assist speech language pathologists who provide intervention to children with CAS in their support of families of CAS who are considering using AAC. A survey design was used to investigate the perspectives of families of children with CAS about AAC.

#### **Participants**

In this study, there were 304 respondents who participated in the survey. The participants belonged to one of three groups at the time of survey completion: (a) the participant had a child with CAS that used an AAC, (b) the participant had a child with CAS that did not use AAC and did not want to acquire one, (c) the participant had a child with CAS that did not use AAC, but was interested in acquiring one.

Demographic information obtained through the survey included how the survey participant was related to the child of CAS, the child's age, when the child was diagnosed with CAS, any other diagnoses that the child had, and what services the child was receiving. Of the 269 participants who completed the question regarding their relation to the child of CAS, 262 participants identified themselves as family, four identified themselves as SLPs working with the child, two identified as caregivers, and one identified as a graduate student. Since the study was looking at family perspectives, the responses from the SLPs and graduate student were not included since they did not finish the survey and did not indicate that they were foster parents or

caregivers. Out of the 262 participants who identified as a family member, 182 were mothers, seven were fathers, one was a grandparent, and 79 did not specify their relation.

## **Survey**

After developing the research survey on Qualtrics, the researcher shared the survey with three faculty members and two graduate students for feedback. The investigator received the completed surveys and revised the layout and questions on the survey based on the feedback provided.

The research survey entitled “CAS and AAC: Family Perspectives” was used for the investigation (see Appendix A). The survey was a 16-page online questionnaire that was designed to obtain information about the perspectives of families of CAS about AAC. The survey included three different sets of questions; the first set gained general demographic information about the participant and their child. For example, child’s age, when the child was diagnosed with CAS, what other diagnoses the child has (if any), what therapy services they are receiving, their therapy goals, what forms of communication the child uses (verbal, gestures, AAC) and how effective these forms of communication were for the child. In the second section, the participants were asked if their child currently uses an AAC. The participants with a child that uses AAC answered a set of questions related to their family’s experience with the device. The families of children who do not use AAC answered a different set of questions. A question asking, “My child has an AAC device, yes or no” would prompt the participant to be directed to the correct set of questions.

If the participants answered “No” for “My child has an AAC device”, the participants answered questions regarding if AAC had been mentioned as an option for their child, and if so, by whom (school SLP, private SLP, other). If AAC had been offered as an option, the

participants were asked to provide information about why they did not obtain AAC for their child (e.g., limited funding, not enough information, etc.). The participants also rated their feelings on a Likert scale (strongly agreed-strongly disagree) on various common “myths” of AAC. This section was looking at the perspectives of families that chose not to have a device or have not been offered one as an option and to analyze if there are any common themes or biases that are important decision factors for families in obtaining AAC for their child with CAS.

If participants answered “yes” to “my child has an AAC device”, the participants were asked to provide the type of professional who suggested AAC as an option, the AAC assessment process, who provided the assessment, and what device was chosen for their child. Families were asked if their child’s device had been incorporated in their child’s speech therapy, and if so, what were the child’s goals. Finally, families with a device were asked to rate their feelings using a Likert scale (strongly agree-strongly disagree) on the level of support they have received (training, information, etc.), funding, and the child’s communication outcomes using the device. This section was looking at the perspectives of families that obtained an AAC device for their child and to analyze if there are any common themes that appear in the usage of an AAC device at home with CAS.

The survey used a variety of question types to obtain information including yes or no question, multiple choice questions, free response questions, and Likert scales. At the end of the survey all participants were given the option to provide any further comments about AAC and CAS.

## **Procedure**

The researcher contacted national and local organizations dedicated to supporting families of children with CAS. The following organizations aided in soliciting participants for

the research study: Childhood Apraxia of Speech Association of North America (CASANA), American Speech-Language-Hearing Association Special Interest Group 12 (AAC), Colorado Speech and Hearing Association, and Kansas Speech-Language-Hearing Association. The researcher also asked speech-language pathologists on the CASANA directory that specialize in CAS to send the survey to related families on their caseload. In addition, the researcher posted the survey to the Facebook CAS organizations Apraxia Momma Bear, and Childhood Apraxia and Speech Therapy.

The researcher invited participants to complete the survey by providing a link and short description of the study survey posted on the participating organization's websites, Facebook pages, newsletters and emails. The link directed subjects to the research survey, which was hosted on the Qualtrics website (<http://www.qualtrics.com>). Participants were first directed to the Information Statement for the study, which explained the purpose of the study. The Information Statement informed participants that continuing and completing the survey provided their consent for participation in the research. The participants were not asked to provide identifying information such as their name or the name of their children. Participants' identities remained anonymous throughout their participation in the study. The researcher had no direct contact with the families involved in the study.

The survey was active from November 2017 to February 2018 on Qualtrics. Analysis of the data began February 2018 and was completed in March 2018. The researcher used Nvivo, a qualitative data analysis software package, to recognize themes in the questions regarding who was taking the survey, child's age, child's age when diagnosed, other diagnosis, services that the child was receiving, the frequency of the services, and the targets in speech-language services.

Qualtrics and Excel were used to synthesize and organize the data from the remainder of the completed questions in the survey

## **Chapter 3**

### **Results**

The purposes of this study were to a) examine the frequency of AAC (specifically SGDs) being offered as an intervention tool for CAS to families, b) the information and support provided to families in regard to AAC, and c) families' perspectives of AAC as an intervention tool for CAS. Participation in this research involved completion of an online survey that was accessed via an anonymous link.

Although 304 participants participated in the survey, only 196 surveys were fully completed. Therefore, the survey completion rate in its entirety was 64%. Participation in the survey generally decreased as the participant progressed through the survey. Furthermore, questions with open text generally had lower response rates. When a percentage is reported, it should be noted that the percentage was calculated with the number of participants who responded to that question, rather than with the number of participants who completed the survey.

#### **Demographic**

The survey obtained demographic information about the participant's child with CAS such as a) the child's age, b) when the child was diagnosed with CAS, c) other diagnoses that the child may have, d) what services the child is receiving, and e) what their speech-language services are targeting.

The participants were asked how old their child was and 267 completed the question. It should be noted that one of the participants reported having twins, both with CAS. Table 1 presents the ages of the children with CAS.

Table 1

*Age of Child with Childhood Apraxia of Speech (CAS)*

<b>Age</b>	<b><i>Number of Participants</i></b>	<b>%</b>
<2 years	27	10.0%
2 years	48	18.0%
3 years	52	19.0%
4 years	34	13.0%
5 years	29	11.0%
≥ 6 years	77	29.0%

Participants were asked how old their child was when they were diagnosed with CAS and 263 participants responded. Table 2 presents that information.

Table 2

*Age that the Child was Diagnosed with Childhood Apraxia of Speech (CAS)*

<b>Age</b>	<b>Number of Participants</b>	<b>%</b>
<2 years	21	8.0%
2 years	78	30.0%
3 years	110	42.0%
4 years	35	13.0%
5 years	8	3.0%
≥ 6 years	8	3.0%
Not specified	3	1.0%

The participants were asked to provide any other diagnosis their child had other than CAS and 258 participants responded. There were 177 participants that reported additional diagnoses. It should be noted that a few participants reported that their child had multiple diagnoses. Table 3 presents the diagnoses that were most frequently reported.

Table 3

*Additional Diagnoses*

<i><b>Diagnosis</b></i>	<i><b>Number of Participants</b></i>
Autism Spectrum Disorder	23
Attention Deficit/Hyperactivity Disorder	16
Dyslexia	12
Dyspraxia	9
Epilepsy	5
Hypotonia	9
Sensory Processing Disorder	40
Other	57
Yes, unknown	6
None at this time	138



A few of the diagnoses that were reported under ‘other’ were 18 p deletion, Sensory Integration Disorder, Learning Disability, Koolen de Vries Syndrome, Down syndrome, Cerebral Palsy, Treacher Collins, Ataxia, Fragile X syndrome and Dysphagia.

The participants were asked to provide information on the speech and language services their child was receiving. There were 262 responses total. Table 4 presents that information.

Table 4

*Speech and Language Services*

<i>Speech and Language Services</i>	<i>Number of Participants</i>	<i>Percentage of Participants Who Responded to this Question</i>
Infant Toddler Services	11	5.0
Private Therapy	90	34.0
School Services	68	26.0
School & Private	56	21.0
Other	28	11.0
None	9	3.0

Participants provided information about how often their child was receiving speech-language services. It should be noted that some participants only responded to this question and did not respond to the previous question and vice versa. The information is organized by frequency and duration in tables by type of speech-language service they were receiving.

Table 5

*Frequency/Duration of Speech-Language Services in Infant Toddler Services*

	<i>30 minutes</i>	<i>60 minutes</i>	<i>&gt;60 minutes</i>	<i>Unspecified</i>
<b>1x a week</b>	X	1	1	1
<b>2x a week</b>	X	X	2	1
<b>3x a week</b>	1	X	X	1
<b>4x a week</b>	2	X	X	2
<b>5x a week</b>	2	X	X	2

Table 6

*Frequency/Duration of Speech-Language Services in Private Practice*

	<b>30 minutes</b>	<b>45 minutes</b>	<b>50 minutes</b>	<b>60 minutes</b>	<b>&gt;60 minutes</b>	<b>Unspecified</b>
<b>&lt;1x a week</b>	X	X	X	2	1	X
<b>1x a week</b>	9	7	1	6	2	X
<b>2x a week</b>	11	7	1	9	X	1
<b>3x a week</b>	14	3	X	3	X	1
<b>4x a week</b>	5	2	X	X	1	X
<b>5x a week</b>	2	X	X	X	X	1
<b>&gt;5x a week</b>	X	X	X	1	X	X

For school based services, some participants disclosed the frequency of services their child received per week (Table 7) and others put the duration (minutes) of service treatment the child received per week (Table 8). The information was organized by frequency and duration.

Table 7

*Frequency/Duration of Speech-Language Services in School Services*

<b>Frequency</b>	<b>Number of Participants</b>
<b>2x a week</b>	3
<b>3x a week</b>	1
<b>5x a week</b>	2

Table 8

*Minutes of Speech Services in School Services*

<b>Duration</b>	<b>Number of Participants</b>
<b>60 minutes a week</b>	9
<b>90 minutes a week</b>	10
<b>120 minutes a week</b>	7
<b>150 minutes a week</b>	10
<b>240 minutes a week</b>	1
<b>30 minutes</b>	20

The frequency and duration of services for those participants receiving both private (Table 9) and school speech-language therapy (Table 10) were organized by the type of speech service (school/ private practice) in the following tables.

Table 9

*Frequency/Duration of Speech-Language Services in Private Practice AND School Services*

Private Practice					
	30 minutes	45 minutes	50 minutes	60 minutes	Unspecified
<b>&lt;1x a week</b>	1	1	X	X	1
<b>1x a week</b>	1	17	2	6	2
<b>2x a week</b>	11	7	1	2	1
<b>3x a week</b>	2	1	X	1	X
<b>4x a week</b>	1	X	X	1	X

Table 10

*Frequency/Duration of Speech-Language Services in Private Practice AND School Services*

School Services				
	<30 minutes	30 minutes	45 minutes	Unspecified
<b>1x a week</b>	1	8	2	1
<b>2x a week</b>	4	13	2	13
<b>3x a week</b>	5	5	1	X
<b>4x a week</b>	2	5	X	1
<b>5x a week</b>	3	2	X	3

The frequency and duration of services for those participants that did not specify where they were receiving them were organized in the table below.

Table 11

*Frequency/Duration of Speech-Language Services in 'Other' (Not Specified)*

	<b>&lt;30 minutes</b>	<b>30 minutes</b>	<b>45 minutes</b>	<b>60 minutes</b>	<b>Unspecified</b>
<b>&lt;1x a week</b>	X	1	X	X	X
<b>1x a week</b>	X	X	X	X	2
<b>2x a week</b>	X	X	X	X	1
<b>3x a week</b>	X	X	3	3	X
<b>4x a week</b>	X	4	3	2	X
<b>5x a week</b>	X	X	1	X	X
<b>&gt;5x a week</b>	2	1	X	X	X

Participants were asked to provide information regarding what was being targeted in their child's speech-language service. Out of the 223 participants who provided the information, 18 participants reported that their child was targeting AAC/Modalities in therapy. Common themes for goals for AAC in therapy were increasing initiations on device, answering/commenting/requesting on device, improving sentence structure on AAC, increasing MLU, and using the device during communication breakdowns.

Participants reported the speech and language goals for their child. One hundred sixty-nine participants reported that their child was receiving speech services targeting articulation. Participants frequently cited goals targeting specific speech sounds, increasing intelligibility at word/phrase/sentence level, increasing MLU, producing accurate grammar, and improving accuracy of motor movement patterns. Six participants reported that their child was targeting social communication, seven were targeting receptive/expressive language, three were targeting literacy skills, and four were targeting fluency. Four participants were unsure what their child

was targeting in speech therapy and ten reported that they were not currently targeting anything in speech.

Participants were asked which communication modalities their child used to communicate. The participants were provided with the options of verbal, gestures, AAC device, and/or other. It should be noted that the participants had the option to choose several of the modalities in regard to how their child communicated. Results are shown in Table 12.

Table 12

*How the Child Communicates*

<b>Modality</b>	<b>Number of participants</b>	<b>%</b>
Verbally	176	49.0%
Gestures	113	32.0%
AAC Device	36	10.0%
Other	31	9.0%

The participants answered on a five-point Likert scale how often their child communicated using the modalities provided and how effective it was. The percentages were calculated with the total responses made per modality on the Likert Scale. The information is presented in the tables below.

Table 13

*How Often the Child Used this Modality*

	<b>Always</b>	<b>Most of the Time</b>	<b>Half of the Time</b>	<b>Sometimes</b>	<b>Never</b>
<b>Verbally</b>	61 (27.0%)	77 (35.0%)	29 (13.0%)	47 (21.0%)	9 (4.0%)
<b>Gestures</b>	22 (10.0%)	54 (25.0%)	39 (18.0%)	86 (39.0%)	18 (8.0%)

<b>AAC Device</b>	2 (0.9%)	5 (2.0%)	13 (6.0%)	40 (19.0%)	151 (72.0%)
<b>Other</b>	3 (2.0%)	9 (6.0%)	3 (2.0%)	37 (23.0%)	106 (67.0%)

Table 14

*How Effective was the Child's Communication*

	<b>Extremely Effective</b>	<b>Very Effective</b>	<b>Moderately Effective</b>	<b>Slightly Effective</b>	<b>Not Effective at All</b>
<b>Verbally</b>	8 (4.0%)	49 (22.0%)	78 (35.0%)	69 (31.0%)	18 (8.0%)
<b>Gestures</b>	17 (8.0%)	59 (28.0%)	96 (45.0%)	36 (17.0%)	4 (2.0%)
<b>AAC Device</b>	7 (4.0%)	19 (12.0%)	28 (17.0%)	15 (9.0%)	92 (57.0%)
<b>Other</b>	6 (5.0%)	6 (5.0%)	24 (20.0%)	14 (11.0%)	73 (59.0%)

It should be noted that the participants were not provided with an option for “Does Not Use” on the survey. Therefore, many participants chose “Never” and “Not Effective at All” for AAC Device and/or ‘Other’ if their child did not use it.

### **CAS and AAC**

In this section, participants were asked if their child used an AAC device. Participants were then directed to a specific set of questions based on their response. A total of 223 participants responded to the question, 73 reporting that their child had an AAC device and 150 reporting that their child did not have a device. Thirty-three percent of the participants who responded had a child with a device. Conversely, sixty-seven percent of the participants did not have a child that used a device.

**No AAC: Family perspectives.** The participants who responded ‘no’ to the question, “does your child have an AAC system” were directed to a set of questions to obtain their

perspectives. Out of the 150 participants who indicated that their child did not have an AAC system, 36 reported that AAC had been suggested to them in the past and 114 participants reported that AAC had not been suggested to them as an option. Out of those that stated that AAC had been suggested to them before, 15 reported that a school staff member suggested it, 12 reported that an outside therapist suggested it, and 15 reported “other.” Out of the school staff members that were cited to have suggested AAC, eight were SLPs, one was a general education teacher, four received the suggestion from a team (IEP), and one did not specify who suggested it. Ten of the outside therapists that suggested AAC were private-practice SLPs; one was not specified. Under the option of ‘other’, three participants reported receiving suggestions from an SLP, two participants reported the suggestion from a physician, two participants reported that they were the one that looked into it and suggested it, and eight participants did not specify.

Participants were asked to provide qualitative information as to why they did not select an AAC system for their child. Out of 109 participants responses, nineteen participants did not select an AAC due to limited funding, eighteen did not select it due to limited information, seventy-five did not select AAC due to ‘other’ reasons. This question did not exclude those that responded ‘no’ to “has an AAC been suggested?” As a result, fourteen participants chose ‘other’ and wrote that it had not been suggested in this question. Common themes that were found when participants were asked why they did not choose an AAC device were that they did not want to limit their child’s communication, their child was reluctant to use it, it was unnecessary, they were currently waiting for more information/or an assessment, the school team was reluctant to use it and because of their child’s age. One participant reported that a school SLP told her and her family that “AAC was not recommended for CAS.”



The participants were asked on a five- point Likert Scale, to state whether they strongly agreed, agreed, disagreed, or strongly disagreed with statements regarding common beliefs about AAC devices. This information is depicted in Table 15. It should be noted that percentages were calculated with the total of responses made per statement.

Table 15

*Statements Regarding Common Beliefs about AAC Devices*

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Neither Agree/Disagree</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>
<b>AAC will limit my child from communicating verbally</b>	8 (7.0%)	30 (26.0%)	30 (26.0%)	12 (10.0%)	37 (32.0%)
<b>AAC is more effective when the child is older and can understand how the device works</b>	13 (11.0%)	29 (25.0%)	38 (32.0%)	22 (19.0%)	16 (14.0%)
<b>My child needs to have certain skills, like using their hands or being able to recognize symbols, before they can use AAC</b>	13 (11.0%)	44 (37.0%)	35 (30.0%)	12 (10.0%)	14 (12.0%)
<b>If my child uses an AAC device he/she will be made fun of or appear to have a disability</b>	4 (3.0%)	29 (25.0%)	36 (31.0%)	17 (14.0%)	32 (27.0%)
<b>AAC costs a lot of money</b>	29 (25.0%)	39 (33.0%)	34 (29.0%)	10 (8.0%)	6 (5.0%)
<b>Using AAC means that my child will appear abnormal</b>	4 (3.0%)	34 (29.0%)	33 (28.0%)	26 (22.0%)	21(18.0%)
<b>AAC will take a lot of time and effort to learn</b>	5 (4.0%)	29 (25.0%)	43 (36.0%)	25 (21.0%)	16 (14.0%)
<b>AAC is the "last resort" in speech language intervention</b>	11 (9.0%)	29 (25.0%)	32 (27.0%)	20 (17.0%)	26 (22.0%)

The participants were asked whether they would like to obtain a device for their child. Out of the 133 participants that completed the question, 36 reported that they would like one for their child and 97 reported that they would not.

**Uses AAC: Family perspectives.** The participants who responded ‘yes’ to “does your child have an AAC system” were directed to a set of questions intended to obtain information regarding their experience and perspective of AAC. Out of the 75 participants who responded that their child used an AAC device, 65 provided information regarding which device their child used. Eleven participants indicated that their child used an SGD, 45 used an iPad application, and 5 chose ‘other’. Out of those that had an SGD, two used a NovaChat, three used an Accent with the LAMP software, two used Tobii, and four did not specify. Out of those that had an iPad application, 14 used Proloquo2Go, 10 used TouchChat, seven used LAMP, and seven used Speak4Yourself. Other iPad applications used were Go Talk Now, My 1<sup>st</sup> AAC, Cough Drop, AACorn, and Let Me Talk. Two participants did not provide which iPad application their child used. Other AAC cited were Galaxy, Amazon Fire, a hip talker, and pictures.

Participants were asked to rate their experience obtaining an AAC system, their experience using it at home, and if they were supported in its use and implementation. They were asked on a five-point Likert Scale, to state whether they strongly agreed, agreed, disagreed, or strongly disagreed with the statements presented on the table below. It should be noted that percentages were calculated with the total of responses made per each statement.

Table 16

*Support and Implementation of AAC at Home*

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Neither Agree/Disagree</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>
<b>I was involved in the decision making of the AAC device for my child</b>	43 (65.0%)	13 (19.0%)	3 (4.0%)	2 (3.0%)	6 (9.0%)
<b>I was given sufficient information about funding options for my child's AAC device</b>	20 (30.0%)	13 (19.0%)	10 (15.0%)	8 (12.0%)	16 (24.0%)
<b>I was provided sufficient training on how to manage and program my child's AAC device (e.g. power on/off, add new vocabulary, create page sets)</b>	15 (23.0%)	16 (24.0%)	11 (17.0%)	9 (14.0%)	15 (23.0%)
<b>I was provided adequate training on how to support my child's communication on his/her AAC device.</b>	13 (19.0%)	17 (25.0%)	9 (13.0%)	12 (18.0%)	16 (24.0%)
<b>I have access to a support system that will help me with my child's device if needed (school staff, therapy staff, etc.)</b>	23 (34.0%)	20 (30.0%)	8 (12.0%)	8 (12.0%)	8 (12.0%)
<b>I feel that my child's use of his/her AAC device is being supported by school staff and outside therapy</b>	19 (28.0%)	15 (22.0%)	15 (22.0%)	9 (13.0%)	9 (13.0%)
<b>I feel comfortable communicating on my child's AAC device at home</b>	25 (38.0%)	18 (28.0%)	9 (14.0%)	8 (12.0%)	5 (8.0%)
<b>I access outside resources frequently regarding AAC (e.g. online AAC resources, AAC</b>	13 (20.0%)	16 (24.0%)	18 (27.0%)	6 (9.0%)	13 (20.0%)

**representatives, CASANA  
articles on AAC)**

<b>My child uses his/her AAC device frequently to communicate at home</b>	8 (12.0%)	14 (21.0%)	8 (12.0%)	19 (29.0%)	17 (26.0%)
<b>My child's AAC device has helped his/her communication</b>	23 (35.0%)	20 (31.0%)	11 (17.0%)	10 (15.0%)	1 (2.0%)

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The participants were then asked how old their child was when they were first provided with information regarding obtaining an AAC device for their child. Out of the 67 participants who answered the question, one participant received information when their child was one-year, 10 participants received information when their child was two-years old, 23 participants received information when their child was three-years old, 14 participants received information when their child was five-years old, and six over the age of five-years. The participants were asked to include who suggested it as an option for their child. Thirteen participants reported that a school-staff member suggested a device, 40 reported that an outside therapist suggested it, and nine reported 'other.' Out of the school staff members, eight were SLPs, two were general education teachers, two were special education teachers, and two were from a team (teacher/SLP; SLP; administrator). Out of the outside therapists who suggested AAC, 32 were SLPs, one was a physical therapist, one was an audiologist, and six were unspecified. Out of those that chose 'other' four cited that they found information about AAC on their own. Participants also listed CASANA website, an ABA therapist, a physician, and a neurologist under 'other.'

Participants were asked if they had received training when their child received an AAC system and 64 participants completed the question. Out of the 64 participants, 31 reported that they had received training and 33 reported that they did not. The participants who received

training were asked to provide additional information about who provided it. Two participants received training from the child's school, nineteen received training from a speech-language pathologist outside of school, seven received training from a device consultant (e.g. Tobii Dynavox, Saltillo), and five received training but did not specify from whom. Those services that were listed under 'other' were assistive technology therapist, ATEC consultant, and child development center. One participant reported that she found the research and support on her own.

In order to obtain more information regarding the use and implementation of AAC in the child's speech-language therapy, participants were asked if the child's device was incorporated in their speech-language therapy sessions. Out of 63 participants, 39 reported that their SLP incorporated the child's device in speech-language therapy and 11 reported that it was not incorporated into speech-language therapy. Two participants cited that only their school speech-language pathologist is using it in therapy, two reported that only their private speech therapist is using it in therapy, six reported that they are not incorporating AAC in sessions anymore due to their child reaching their goals, one reported that their child would begin using it in future sessions, and one reported that it was used occasionally. Those who had a child who used AAC in their speech-language therapy sessions were asked to provide speech-language goals that were being targeted in the session. The following themes were identified: answering questions using the device, increasing combination of words to create phrases/sentences, naming colors/shapes/numbers, using the device during communication breakdowns, increasing initiations on device, and effectively communicating and operating the device.

### **Cross-Tabulations**

To further describe the relationship of the effectiveness of the child’s verbal communication and the family’s desire for an AAC system, cross tabulation was completed. The cross-tabulation was formulated in Qualtrics between questions, “How effective is your child’s communication (Verbal)” and “I want my child to have an AAC system. Results are shown in the table below.

Table 17

*Verbal Effectiveness and AAC*

		<b>How effective is your child’s communication (Verbally)</b>					
<b>I want my child to have an AAC system</b>		<b>Extremely Effective</b>	<b>Very Effective</b>	<b>Moderately Effective</b>	<b>Slightly Effective</b>	<b>Not Effective at All</b>	<b>Total</b>
	<b>Yes</b>	0	1	16	13	6	36
	<b>No</b>	7	36	32	19	3	97
	<b>Total</b>	7	37	48	32	9	133

To further describe the relationship in decision-making and who provides it, a cross-tabulation was completed. The cross-tabulation was formulated between questions, “I was involved in the decision making of the AAC device for my child” and “who offered it as an option (e.g. school staff, outside therapy”. Results are shown in the table below.

Table 18

*AAC Decision-Making*

<b>I was involved in the decision making of the AAC device</b>						
	<b>Strongly Agree</b>	<b>Somewhat agree</b>	<b>Neither agree nor disagree</b>	<b>Somewhat disagree</b>	<b>Strongly disagree</b>	<b>Total</b>

<b>Who offered it as an option (e.g. school staff, outside therapy)</b>	<b>School Staff</b>	3	5	1	1	3	13
	<b>Outside Therapy</b>	29	7	32	0	0	37
	<b>Other</b>	7	1	2	1	1	12
	<b>Total</b>	39	13	3	2	5	62

To further describe the relationship of training and comfort level of communicating on child's AAC, the cross-tabulation was formulated between "were you provided training when your child received an AAC system" and "I feel comfortable communicating on my child's AAC device at home." Results are shown in the table below.

Table 19

*Communication Partner Training*

Were you provided training when your child received an AAC system?				
I feel comfortable using my child's AAC device		Yes	No	Total
	Strongly Agree	12	10	22
	Somewhat agree	11	7	18
	Neither agree nor disagree	4	4	8
	Somewhat disagree	2	5	7
	Strongly disagree	0	5	5
	Total	29	31	60

To further describe the relationship of comfort level of communicating on their child's device at home and the frequency of the child's use of their AAC at home. The cross-tabulation was formulated between "My child uses his/her AAC device frequently to communicate at home" and "I feel comfortable communicating on my child's AAC device at home". Results are shown in the table below.

Table 20

*AAC Use at Home*

<b>I feel comfortable communicating on my child's AAC device at home</b>							
		<b>Strongly Agree</b>	<b>Somewhat agree</b>	<b>Neither agree nor disagree</b>	<b>Somewhat disagree</b>	<b>Strongly disagree</b>	<b>Total</b>
<b>My child uses his/her device frequently at home</b>	<b>Strongly agree</b>	8	0	0	0	0	8
	<b>Somewhat agree</b>	7	6	1	0	0	14
	<b>Neither agree nor disagree</b>	4	2	2	0	0	8
	<b>Somewhat disagree</b>	4	9	2	2	1	18
	<b>Strongly disagree</b>	2	1	4	6	4	17
	<b>Total</b>	25	18	9	8	5	65

To further describe the relationship between the frequency of the child's use of their AAC at home and if the AAC device has helped his/her communication a cross-tabulation was formulated between questions, "My child uses his/her AAC device frequently to communicate at



home” and “My child’s AAC device has helped his/her communication”. Results are shown in the table below.

Table 21

*Child’s AAC Use*

My child uses his/her AAC device frequently to communicate at home							
My child’s AAC device has helped his/her communication		Strongly Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total
	Strongly agree	8	10	3	2	0	23
	Somewhat agree	0	4	3	11	2	20
	Neither agree nor disagree	0	0	2	4	5	11
	Somewhat disagree	0	0	0	1	9	10
	Strongly disagree	0	0	0	0	1	1
	Total	8	14	8	8	17	65

To further describe the relationship between the incorporation of AAC in speech-services and positive beliefs that the child’s device has helped his/her communication, a cross-tabulation was formulated between “Is the AAC device being incorporated in your child’s speech language services” and “My child’s AAC device has helped his/her communication”. Results are shown in the table below

Table 22

*AAC and Speech Services*

		Is the AAC device being incorporated in your child's speech language services		
My child's AAC device has helped his/her communication		Yes	No	Total
	Strongly Agree	15	3	21
	Somewhat agree	15	1	19
	Neither agree nor disagree	4	3	10
	Somewhat disagree	5	3	9
	Strongly disagree	0	1	1
	Total	39	11	60

## **Chapter 4**

### **Discussion**

The purpose of this study was to a) examine the frequency of AAC (specifically SGDs) being offered as an intervention tool for CAS to families, b) the information and support provided to families in regard to AAC, and c) families' perspectives of AAC as an intervention tool for CAS. A survey design was used to investigate the perspectives of families of children with CAS about AAC.

#### **Frequency of AAC**

Sixty-seven percent (n= 223) of the participants reported that their child did not use an AAC device. Out of those participants only 24% had been given the suggestion to obtain an AAC device for their child. Based on the literature (Burnam, 2005; Millar et al, 2006; Binger and Light, 2007), this could be due to participants having a child who was making substantial gains in their speech therapy and that it would have been unnecessary to incorporate AAC, and/or the parent did not have enough information regarding AAC and was hesitant to want to pursue AAC for their child.

The researcher anticipated, based on past findings (Bornman et al., 2001; Binger and Light, 2007; ASHA, 2007) that families of children whose verbal communication was not meeting their needs would want to obtain an AAC system more than those with a child with effective verbal communication. Table 17 indicated that 46% (n=41) of participants with a child who had slightly/not effective verbal communication wanted to obtain a device and that only 3% (n=44) of those with a child who had extremely/very effective verbal communication wanted AAC for their child. Though this was what the researcher expected, it should be noted that the child's effectiveness of verbal speech was rated on a 5-point scale and that it is possible that the

families' judgement of their child's verbal communicative efficacy may not align with a professional's judgement.

The lack of knowledge regarding AAC could be a contributing factor as to why parents and professionals are reluctant to introduce AAC into a child's intervention plan. As supported by the literature in (Cumley, n.d.; Bornman et al., 2005; Lüke, 2014), traditionally, SLPs do not introduce AAC into their intervention plan with children with CAS. This may be due to the SLPs lack of knowledge regarding AAC, how to implement the device in therapy and/or how to approach families with the information and provide ongoing support. Families need to know all of the information available before they can make a decision that best fits the needs of their child and family. Though there are improvements that can be made when providing speech-language services that target and use multiple modalities to improve communication and language, it is common that families of children with CAS are unaware of AAC as a therapeutic and supportive intervention for their child as demonstrated in the Likert scale in Table 15.

Participants who do not have a child that uses AAC had the highest agreement rate with the statements, "My child needs to have certain skills, like using their hands or being able to recognize symbols, before they can use AAC" and "AAC costs a lot of money". This reflects Ronski and Sevcik's (2005) findings that these ideologies are common among families; however, it is the professional's job to discuss current research relative to these beliefs and provide information regarding funding options. Based on the literature (Hanline et al, 2007; Millar et al., 2006; Ronski and Sevcik, 2005; Silverman, 1995;), there are many children who could benefit from a form of AAC entering schools with no prior exposure to it. This may be due to the uncertainty on the part of both professionals and parents about when to introduce AAC

into to a child's speech services and the lack of information and support provided to families regarding funding options.

This study's data confirmed that families of children with CAS typically believe that their child must have prerequisite sensorimotor skills or a certain intellectual performance before receiving an AAC device. However, as Ronski and Svecik (2005) noted, individuals with sensory-motor disabilities, such as children with CAS, cannot demonstrate their true cognitive abilities without a means to communicate. They also argue that given the overall impact language has on cognitive development, a lack of language skills and a means to develop these skills will put an individual at a developmental disadvantage. To further this point, Drager et al. (2010) reported that AAC intervention for children with complex communication needs can help improve functional communication skills, as well as, provide a foundation for literacy development.

The results depicted in Table 15 indicate that the cost of AAC is one of the primary barriers to families obtaining an AAC device. Eight of those families received services from schools, six received services from private practice, and five received services from school and private practice, suggesting that those receiving speech services from schools may not be receiving enough information regarding funding for AAC devices (e.g. grants, insurance). As stated in past literature (Ronski and Svecik, 2005), the cost of an SGD can be a deterring factor to families, with costs ranging around \$4,000 without accessories. Beukelman et al. (2007) noted in their study that the cost can often impede families and users from wanting to pay for a device out of pocket, which means that speech language pathologists must rely on insurers and grants to decrease the costs. Medicaid, Medicare and many Private Insurers now provide a range of

coverage and it is the SLPs job to be aware of the funding options and conveying this information to the families.

Other options are using an existing touch screen device such as an iPad, and download AAC software on it. This will decrease those costs to around \$600 and is typically a more sought-after option (Beukelman, Garrett, and Yorkston, 2007). However, these systems, unlike the dedicated SGDs, will not be paid for by an insurance company, according to ASHA (2002). The third option, that is often overlooked by professionals and families, is low-tech AAC which can be implemented with limited costs and can help support a child's communication. Low-tech AAC can be a communication board, individual graphic symbols, or a single/multi-message device to name a few (ASHA, 2002). It is the speech language pathologists job to be aware of the different options of AAC and to provide education to clients and their families regarding all of the options that exist. When families are presented with all of the necessary information, they are able to make decisions that they feel will be most beneficial for their child.

The researcher speculated that based on the findings from past literature (Drager et al, 2010; Millar et al., 2006; Ronski and Svecik, 2005) the primary reason participants did not choose an AAC for their child would be due to "fear of limiting their child's speech." Though many families noted in the comment section that they did not want their child to rely on the device and that they wanted them to continue focusing on improving their natural speech in therapy, the primary reason participants did not want a device was due to "not having enough information." These findings correlate with the studies conducted by Bailey, (2006), Hetzroni, (2002) and Parette et al., (2000) who reported that families are often deterred from seeking a device for their child due to limited knowledge regarding the use and benefits of AAC. Families may not be incorporated enough in the decision-making process regarding their child's services

and that professionals may be making decisions regarding the use of AAC before including the parents in the discussion. SLPs may also be hesitant to introduce AAC to parents either due to their own lack of knowledge and/or due to limited time and money, as found in Amundsen's (2014) study. Further research is needed to determine the perspectives of SLPs in regard to the incorporation of AAC with children with CAS.

### **Support and Implementation of AAC at Home**

Based on past research (Bailey et al., 2006; Hetzroni, 2002; Parette et al. 2000), one would expect that many of the participants with a child who used AAC would indicate that they were not involved in the decision-making process. However, as demonstrated in Table 16, 83% (n=67) of participants indicated that they strongly/somewhat agreed that they were involved in the decision process for AAC. After a cross-tabulation was made (Table 18) data showed that 69% (n=52) of those who strongly/somewhat agreed that they were involved in the decision-making process had received AAC as an option from outside-therapy. In contrast, only 25% (n=52) of the participants who strongly/somewhat agreed that they were involved in the decision process had received AAC as an option from the schools. These findings are in agreement with the study conducted by Hetzroni (2002) where he found that only 21% of families surveyed were involved in the school's decision-making process regarding AAC and services. It is possible that school SLPs may be limited in their ability to include and involve families more than outside therapists who have more direct contact with the parents.

Schlosser (2003) urged that the processes and decision-making regarding AAC use and the involvement of the team should concentrate on the direct stakeholder- the AAC user and their family. It is important that this principle is established early on since that family will need ongoing support throughout the implementation of the AAC device, especially at home and in

the community and will be the consistent support and advocate for the child. Having the professionals be the sole decision maker on AAC intervention displaces trust and undermines the respect that should be given to families for their expertise regarding their child (Parette et al., 2000). The inability to incorporate families can lead to feelings of frustration due to the lack of information they are receiving. As Bailey et al. (2006) reported, it is important to incorporate families in the decision-making process in order to build rapport and make sure their values and beliefs are being respected.

Thirty-three out of 64 participants (52%) indicated that they had not received training when their child received an AAC device. These results show that families may not be receiving enough support after obtaining an AAC device for their child. This could lead to abandonment and underutilization of the device. Fifty-eight percent (n=31) of the participants received training from an outside therapist while only 6%(n=31) received training from their child's school. As pointed out by Amundsen (2014), clinicians may find it challenging to assign time to provide indirect and direct interventions for communication partners within educational, medical and private practice environments. Clinicians can also have difficulty obtaining reimbursements for the time spent conducting the trainings and in a school setting there may not be the flexibility in service delivery to provide training. The need for support of communication partners is often ignored; therefore, significant advocacy efforts may be required from the family in order to receive training to support their child's device at home.

As shown in Table 19, 79% (n=60) of the participants who were provided training indicated that they "somewhat or strongly agreed" that they were comfortable communicating on their child's AAC device at home. In contrast only 55% (n=60) of the participants who did not receive training "strongly/somewhat agreed" that they felt comfortable using their child's device



(see Table 19). Thus, the participants who received training and support were more likely to feel comfortable implementing and supporting their child's communication at home. The results from this study supports previous findings (Bornman et al., 2005; Kent-Walsh, Murza, Malani, and Binger, 2015; Bailey et al., 2006; Parette et al., 2000) reporting that partner instruction has positive effects on communication at home and supports improvements in expressive language in children with complex communication needs. Families who are provided training are more likely to increase interactions on the child's device, ask more questions in accordance with higher cognitive levels and provide more opportunities for the child to access higher levels of language functioning (Bornman et al., 2001). Knowing this, it is essential that families are provided training on how to use the specific device they are obtaining for the child and that they are receiving ongoing support throughout the child's experience with their device. Parette et al. (2000), suggested in their study that SLPs can provide support to parents by presenting them with information on how to manage and program the device, give them opportunities to observe or watch a video of a child using a similar device and provide hands on experience before having the families use the device at home.

As shown in Table 20, 60% (n=65) of the participants who "strongly agreed" that they felt comfortable communicating on their child's device, also "strongly agreed" that their child used their device frequently to communicate at home. In contrast, 80% (n=65) of those who "strongly disagreed" with feeling comfortable using their child's device at home "strongly disagreed" that their child used their device frequently at home. Families who are comfortable communicating on their child's device may encourage their child's use of the device more frequently than those who are not comfortable using the device. The current findings are in agreement with past findings (Binger et al., 2010; Bornman et., 2001; Kent-Walsh and Binger,

2015) demonstrating that when families are provided partner-instruction, AAC use can enhance communication. Kent-Walsh and Binger (2015) noted that this as result will improve family relationships and increase independence for the child. It is important that families are given sufficient amount of instruction routinely until it is evident that the family can demonstrate successful communicative interactions in all settings. Further research is needed regarding partner-instruction in families who have children with CAS.

One hundred-percent (n=65) of the participants who “strongly/somewhat agreed” that their child used their device frequently also “strongly/somewhat agreed that the device has helped his/her communication (See Table 21). The data indicate that those children who used their device more frequently at home demonstrated improvements in their communication via AAC. It should be noted; however, that other targeted areas in speech-services (motor planning, articulation, etc.) were not taken into consideration when looking at improvements.

Only 62% of the participants (n=63) reported that the AAC device was being incorporated in the child’s speech therapy services. There were not enough responses obtained to gather where the participant’s child was primarily receiving AAC intervention. Those that receive AAC intervention may show improvements in their communication with the incorporation of the device in their speech therapy. The data displayed in Table 22 demonstrated that 77% of participants (n=39) with a child receiving AAC intervention, “strongly/somewhat agreed” that the device has helped their child’s communication. In contrast, only 36% of participants with a child whose AAC was not being incorporated into the speech sessions responded that they “strongly/somewhat agree” that AAC has helped their child’s communication. This information indicates that it is crucial that therapists include the child’s AAC in therapy in order to increase the likelihood of improvements in various areas of

communication such as communication repairs, topic initiations, small talk, narrative discourse, message length, and message complexity. As suggested by Binger and Light (2007), this may increase the child's confidence and in turn decrease communication frustrations and challenging behaviors.

### **Family Perspectives of AAC**

Participants were provided a comment section in order to give further insight on their perspective of AAC. The following comments were made by participants who did not have a device for their child, but indicated that they wanted one for their child in the future:

*"I want my child to have an AAC, one hasn't been suggested to us so I'm not sure if it's the right thing for my child. I don't know much about them, so I'm indifferent to whether or not I want him to have one".*

*"My son has no other delay than his CAS. He has appropriate fine motor (skills) and has learned sign quickly, but he is around many different people who do not all know the signs. I think an AAC device would be more appropriate for him to be able to express everything he wants to with all the people in his environment...we did get push back from our evaluation team because it could delay speech; however, I told her that the research I read on CASANA and ASHA websites do not support that. Therefore, AAC is in his IFSP to explore."*

*"My worry is how would he carry it around to use? I can't see my son with some sensory problems wearing a big thing around his neck, nor carrying this device around....his teacher in EI also said she does not like them yet for kids as young as him, and they prefer PECs, but my son has a sensory need to peel, so the act of pulling the desired card off of Velcro in 1 place and*

*onto your “sentence board” just turns to him wanting to peel them all on and off. I think an AAC may be best, but I am not sure where to start.”*

The following responses were made by participants who indicated that their child did not have a device and that they do not want to obtain one for their child:

*“My daughter was enrolled in intense and frequent speech therapy, as was recommended at an early age, and consequently her verbal speech and intelligibility improved so much that she never needed AAC support”.*

*“Not opposed to one. Just feel like my son is progressing with speech and don’t want the machine to hinder that.”*

*“I’m still on the fence. I could be willing to try it, but am worried about the learning curve*

Participants who did have a child with an AAC device were asked to provide further information regarding their child’s and families’ experiences with AAC (support/training, implementation of device at home, etc.). The following comments were given:

*“I find the program difficult and time consuming.”*

*“My son is starting to understand the power that using his talker gives him”*

*“We just received our AAC device and we were given different programs because our school and private therapist did not communicate. Therefore, we are struggling to use it”.*

*“I had to educate our AT consultant SLP on the device. I had to push for faster acquirement which resulted in me choosing (I am also an SLP). It was extremely difficult and a slow process and without my constant vigilance to get him AAC ASAP he would have waited at least 6-months before being able to communicate. It was an extremely frustrating process. Not everyone on his team was on board and it took a lot of advocating on my part to get it included at school and in therapy even outside of his assistive technology therapy. I believe the way SLPs look at AAC needs to change a robust system needs to be put in the hands of any child who needs it, as soon as possible. It should be considered critical to their treatment.”*

*“When my child needed it, we wanted him to have it, and we made sure he did. We believed 100% in the need for it as an effective tool for him, necessary at the time, but hopefully a transitional step toward verbal communication. Systematic issues that we feel are pervasive held him back from using it effectively- poor ethics on the part of those who should have support it- self-interest instead of support for the kids who they are supposed to serve. We are very grateful he can now speak beautifully, with continued hard work.*

*“It has been one of the best decisions ever made. My son was completely nonverbal before getting our device. It has helped with him being able to tell us something and has lowered his frustration with everyday life. My son can now order his own food at restaurants without us having to guess what he would like. It has truly been a blessing for our family.”*

*“We used an augmentative device A LOT when we first got it when she was younger and nonverbal. As she got older and gradually more verbal, she preferred to use her words instead of her device. We struggled with incorporating her AAC device into the school system, however. The teachers did not quite know how to incorporate it into their lessons, so we lost a lot of ground work every year. Which I think is why she didn’t use it as much once we got out of the preschool setting. It definitely gave her a voice when she was nonverbal, however. I recommend it to all of my parents.*

These comments reflect many of the findings of this study. Specifically, it revealed that majority of families do not have a child who used AAC, stating that a lack of information regarding the benefits and implementation of the device in their child’s speech therapy and the lack of information regarding funding were main barriers. Those that did have AAC primarily reported wanting and needing further information and support from professionals in how to implement their child’s device at home. The families that had been provided with support and training and reported were more likely to note improvements in their child’s communication and view it as a beneficial component to the child’s improvement of communication.

### **Clinical Implications**

This study was designed to gather the perspectives of families of children with CAS and help speech-language pathologists better support these families. Speech-language pathologists and other related service professionals could use the data obtained in this study to improve their service delivery models for children with CAS and their families by increasing their knowledge related to AAC technology and the benefits of a multi-modal approach to therapy.

Speech-language pathologists who provide services to children with CAS should have knowledge and experience with AAC in order to discern which children would benefit from a

multi-modal approach in their intervention plan. This includes information about funding and the evidence regarding the impact of implementation of AAC on speech and language. The awareness of the benefits of AAC will most likely increase the probability of families making decisions that they know will best benefit their child's communication progress, whether that includes incorporating AAC or not. Families want professionals to guide them and provide them with information regarding their child's diagnosis and service options. Families noted throughout the survey that they felt "lost and alone in dealing with this diagnosis," indicating that professionals need to make it their priority that they provide ongoing support and guidance to families of children with CAS.

### **Limitations**

Limitations of this study include the families' responses for all questions, the participants' experience with AAC, participant's knowledge regarding the use and implementation of AAC in services and at home, and the generalization of results to other families. A total of 64% (n=303) of participants completed all of the questions in the survey. The participation generally decreased as participants progressed through the survey and/or if they were required to provide further detail in questions. Though the survey was designed for families with a child with CAS who was receiving speech-services, there were some participants who completed the survey with a child who was older and was no longer receiving services. Furthermore, there was a participant with a set of twins with CAS, and information was not gathered separately for the two children.

In the questions "What is the amount of time your child communicates..." and "How effective is your child's communication", there was no option for "My child does not use this

modality.” Therefore, many families chose ‘never’ or ‘not effective at all’ for the areas that their child does not use that communication modality, potentially skewing the data.

There were 177 ‘other diagnosis’ reported; however, the study did not separately analyze results from participants with other diagnoses. Therefore, results from this study may not generalize to families of children with other diagnoses besides CAS. In addition, only 16 families reported that their child was diagnosed at the age of 5 or older, suggesting that this group was minimally represented with compared to other families whose child were diagnosed between 1 and 4 years.

### **Future Research**

There are few research studies regarding CAS and AAC intervention; therefore, further research is needed in order to determine the effects of implementation of AAC in therapy to improve communication in those with a motor speech disorder. It is suggested that larger sample sizes be implemented in studies in order to determine the generalizability of the current findings and to learn more about the experiences of children with CAS and their families with AAC.

Further research should also focus on learning more about the perspectives of speech-language pathologists concerning CAS and AAC and as well as their training in these areas. Furthermore, it would be useful to obtain data on barriers that SLPs face in obtaining and implementing AAC for children with CAS, particularly in a school setting, such as funding and limited access to parents. It would be helpful to obtain information about features and characteristics of devices, as well as intervention techniques and goals that predict successful use of AAC in children with CAS. This future research could improve the communication outcomes for children with CAS.



APPENDIX A  
CAS and AAC: Family Perspectives Survey

## Research Consent Statement

The Department of Speech Language Hearing at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

We are conducting this study to better understand your perspective of augmentative and alternative communication and Childhood Apraxia of Speech. This will entail your completion of the survey. Your participation is expected to take approximately 20 minutes or less to complete. The content of the survey should cause no more discomfort than you would experience in your everyday life.

Although participation may not benefit you directly, we believe that the information obtained from this study will help us gain a better understanding of the use of augmentative and alternative communication for children with Childhood Apraxia of Speech. Your participation is solicited, although strictly voluntary. Your name will not be associated in any way with the research findings. It is possible, however, with internet communications, that through intent or accident someone other than the intended recipient may see your response.

If you would like additional information concerning this study before or after it is completed, please feel free to contact us by phone or email.

Completion of the survey indicates your willingness to take part in this study and that you are at least 18 years old. If you have any additional questions about your rights as a research participant, you may call (785) 864-7429 or write the Human Research Protection Program (HRPP), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, email [irb@ku.edu](mailto:irb@ku.edu).

Sincerely,

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Q3 By agreeing to participate you are indicating that you are at least 18 years of age and have read and comprehended the informed consent

☐ Yes, I have read the informed consent

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Q16 Who is filling out this survey? (family, caregiver, etc.)

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Q17 How old is your child?

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Q18 When was your child diagnosed with Childhood Apraxia of Speech?

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Q31 Does your child have any other diagnosis? (e.g. autism spectrum disorder, etc.)

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Q12 What speech-language services is your child currently receiving?

☐ Infant Toddler Services

☐ Private therapy

☐ School services

☐ Other (please specify) \_\_\_\_\_

Q39 How often is your child receiving speech-language services? (e.g. once week for 45 minutes)

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Q40 What speech goals are they targeting in speech-language therapy with your child?

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Q20 How does your child primarily communicate? (check all that apply)

☐ Verbally

☐ Gestures

☐ AAC device

☐ Other (please specify) \_\_\_\_\_

Q34 What is the amount of the time your child communicates...

	Always	Most of the time	About half the time	Sometimes	Never
Verbally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gestures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAC Device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q35 How effective is your child's communication...

	Extremely effective	Very effective	Moderately effective	Slightly effective	Not effective at all
Verbally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using gestures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using AAC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q37 Does your child have an AAC system (speech generating device, iPad AAC app)

☐ Yes

☐ No

Q10 Has an AAC system been suggested?

☐ Yes

☐ No

Q11 If yes, who provided it as an option (e.g. school staff, outside therapy)?

☐ School staff (please specify) \_\_\_\_\_

☐ Outside therapy (please specify)  
\_\_\_\_\_

☐ Other (please specify) \_\_\_\_\_

Q14 I did not select an AAC system due to.... (e.g. limited funding, not enough information, not wanting to limit child's verbal communication )

☐ Limited funding

☐ Not enough information

☐ Other \_\_\_\_\_

Q13 The following are statements regarding beliefs about AAC systems. For each statement, please state if you strongly agree, agree, disagree, or strongly disagree.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
AAC will limit my child from communicating verbally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAC is more effective when the child is older and can understand how the device works	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child needs to have certain skills, like using their hands or being able to recognize symbols, before they can use AAC	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If my child uses an AAC device he/she will be made fun of or appear to have a disability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAC costs a lot of money	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using AAC means that my child will appear abnormal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAC will take a lot of time and effort to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAC is the "last resort" in speech language intervention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Q27 I want my child to have an AAC system

☐ Yes

☐ No

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Q28 If you have any additional comments regarding CAS and AAC, please provide them below:

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Page Break

Q22 What AAC system does your child currently have? (Please specify)

☐ Speech generating device (Accent, Tobii, etc.)

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☐ iPad application (LAMP, Proloquo2Go, etc.)

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☐ Other 

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Q21 For each statement, please state if you strongly agree, agree, disagree, or strongly disagree.



	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I was involved in the decision making of the AAC device for my child	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was given sufficient information about funding options for my child's AAC device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was provided sufficient training on how to manage and program my child's AAC device (e.g. power on/off, add new vocabulary, create page sets)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was provided adequate training on how to support my child's communication on his/her AAC device.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I have access to a support system that will help me with my child's device if needed (school staff, therapy staff, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that my child's use of his/her AAC device is being supported by school staff and outside therapy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable communicating on my child's AAC device at home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I access outside resources frequently regarding AAC (e.g. online AAC resources, AAC representatives, CASANA articles on AAC)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child uses his/her AAC device frequently to communicate at home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My child's AAC device has helped his/her communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15 How old was your child when you were first given information about obtaining an AAC device for your child?

\_\_\_\_\_

Q29 Who offered it as an option (e.g. school staff, outside therapy)

☐ School staff (please specify) \_\_\_\_\_

☐ Outside therapy (please specify)

\_\_\_\_\_

☐ Other (please specify) \_\_\_\_\_

Q23 Were you provided training when your child received an AAC system?

☐ Yes

☐ No

Q24 If yes, who provided the training?

☐ School

☐ Speech therapist outside of school

☐ Device Consultant (e.g. Tobii Dynavox, Saltillo)

☐ Other \_\_\_\_\_

Q38 Is the AAC device being incorporated in your child's speech-language services?</p>

☐ Yes

☐ No

☐ Other \_\_\_\_\_

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Q41 If yes, do they have any speech goals using their AAC device?

☐ Yes (please include the AAC goals)

\_\_\_\_\_

☐ No

☐ Other \_\_\_\_\_

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Q26 <p>If you have any additional comments regarding CAS and AAC, please provide them below: </p>

\_\_\_\_\_

End of Block: Default Question Block

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